

10.3

Inscribed Angles

- Goals**
- Use inscribed angles to solve problems.
 - Use properties of inscribed polygons.

VOCABULARY

Inscribed angle

Intercepted arc

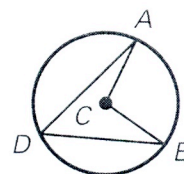
Inscribed polygon

Circumscribed circle

THEOREM 10.8: MEASURE OF AN INSCRIBED ANGLE

If an angle is inscribed in a circle, then its measure is half the measure of its intercepted arc.

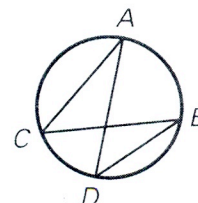
$$m\angle ADB = \frac{1}{2} \text{_____}$$



THEOREM 10.9

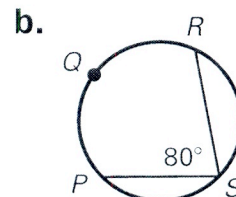
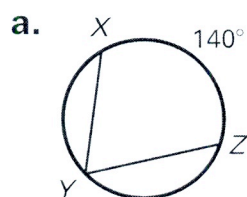
If two inscribed angles of a circle intercept the same arc, then the angles are congruent.

$$\angle C \cong \angle \text{_____}$$



Example 1 Measures of Arcs and Inscribed Angles

Find the measure of the arc or angle.



a. $m\angle XYZ = \frac{1}{2} \underline{\hspace{1cm}} = \frac{1}{2} (\underline{\hspace{1cm}}^\circ) = \underline{\hspace{1cm}}^\circ$

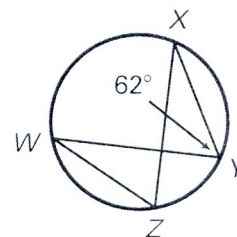
b. $m\widehat{PQR} = 2m\angle \underline{\hspace{1cm}} = 2(\underline{\hspace{1cm}}^\circ) = \underline{\hspace{1cm}}^\circ$

Example 2 Finding the Measure of an Angle

It is given that $m\angle Y = 62^\circ$. What is $m\angle Z$?

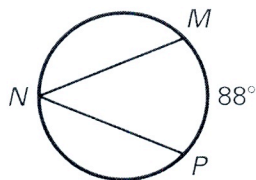
$\angle Y$ and $\angle Z$ both intercept \widehat{WX} , so $\underline{\hspace{1cm}} \cong \underline{\hspace{1cm}}$.

Answer So, $m\angle \underline{\hspace{1cm}} = m\angle \underline{\hspace{1cm}} = \underline{\hspace{1cm}}^\circ$.

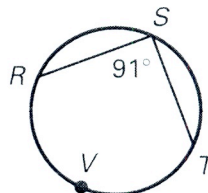


✓ Checkpoint Find the measure of the arc or angle.

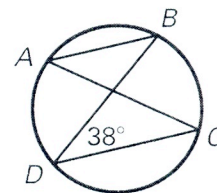
1. $\angle MNP$



2. \widehat{RVT}



3. $\angle A$



Study Guide

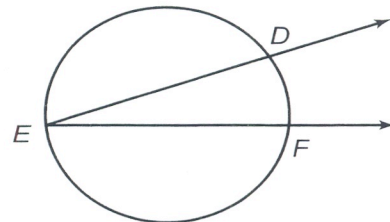
10.3 Blue

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Inscribed Angles

An **inscribed angle** of a circle is an angle whose vertex is on the circle and whose sides contain chords of the circle. We say that $\angle DEF$ intercepts \widehat{DF} . The following theorems involve inscribed angles.

- If an angle is inscribed in a circle, then the measure of the angle equals one-half the measure of its intercepted arc.
- If inscribed angles of a circle or congruent circles intercept the same arc or congruent arcs, then the angles are congruent.
- If an inscribed angle of a circle intercepts a semicircle, then the angle is a right angle.



Example: In the circle above, find $m\angle DEF$ if $m\widehat{DF} = 28$.

Since $\angle DEF$ is an inscribed angle,

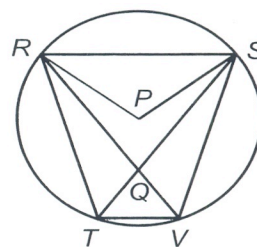
$$m\angle DEF = \frac{1}{2} m\widehat{DF} = \frac{1}{2} (28) \text{ or } 14.$$

In $\odot P$, $\overline{RS} \parallel \overline{TV}$.

1. Name the intercepted arc for $\angle RTS$.

2. Name an inscribed angle.

3. Is $\angle RQS$ an inscribed angle?



In $\odot P$, $m\widehat{SV} = 86$ and $m\angle RPS = 110$. Find each measure.

4. $m\angle PRS$

5. $m\widehat{RT}$

6. $m\angle RVT$

7. $m\angle SVT$

8. $m\angle TQV$

9. $m\angle RQT$

10. $m\angle QRT$

11. $m\widehat{RS}$

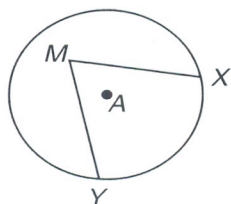
Skills Practice

10.3 Blue

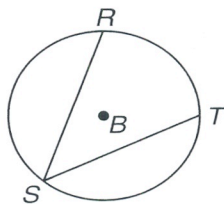
Inscribed Angles

Determine whether each angle is an inscribed angle. Name the intercepted arc for the angle.

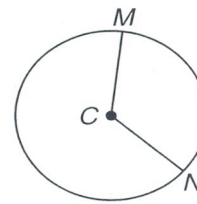
1. $\angle XMY$



2. $\angle RST$



3. $\angle MCN$



Find each measure.

4. $m\angle EDA$

5. $m\widehat{DE}$

6. $m\angle BDA$

7. $m\angle BDE$

8. $m\angle ZYW$

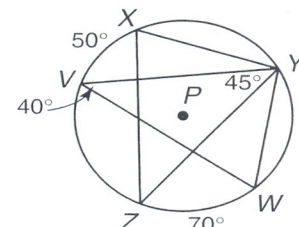
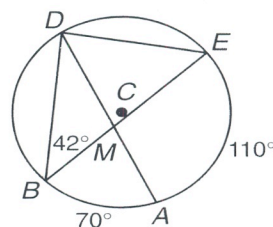
9. $m\widehat{VZ}$

10. $m\angle XYV$

11. $m\widehat{WY}$

12. $m\widehat{XY}$

13. $m\angle XZY$

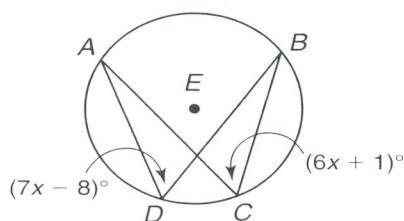


Exercises 4-7

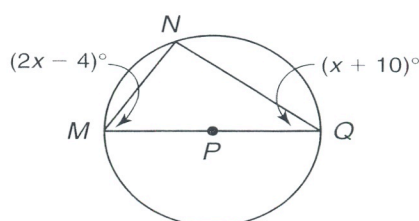
Exercises 8-13

Find the value of x in each circle.

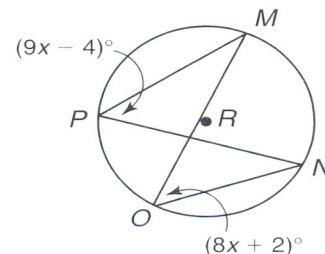
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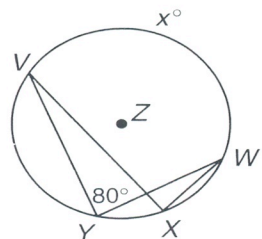
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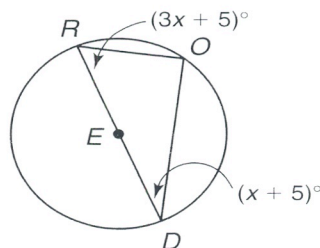
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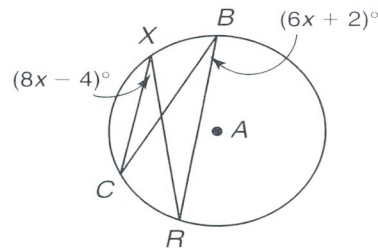
17.



18.



19.



Practice

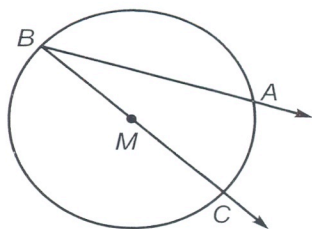
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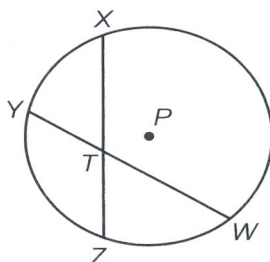
Inscribed Angles

Determine whether each angle is an inscribed angle.
Name the intercepted arc for the angle.

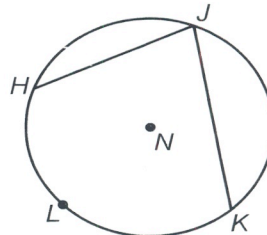
1. $\angle ABC$



2. $\angle XTW$



3. $\angle HJK$



In $\odot P$, $m\widehat{AB} = x$ and $m\widehat{BC} = 3x$. Find each measure.

4. $m\widehat{ADC}$

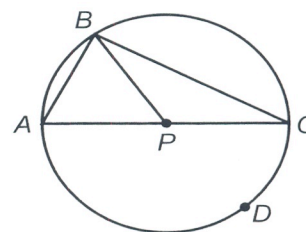
5. $m\angle ABC$

6. $m\widehat{AB}$

7. $m\angle A$

8. $m\widehat{BC}$

9. $m\angle C$



In $\odot Q$, $m\angle ABC = 72$ and $m\widehat{CD} = 46$. Find each measure.

10. $m\widehat{CA}$

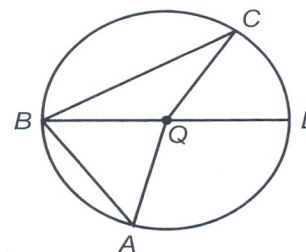
11. $m\widehat{BC}$

12. $m\widehat{AD}$

13. $m\angle C$

14. $m\angle ABD$

15. $m\angle A$

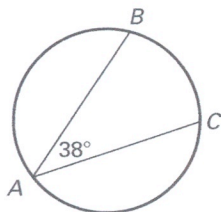


Practice A

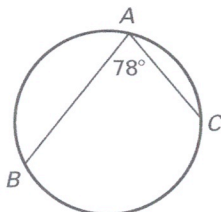
For use with pages 613–620

Find the measure of the indicated arc or angle.

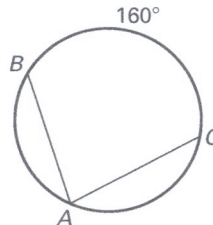
1. $m\widehat{BC} = ?$



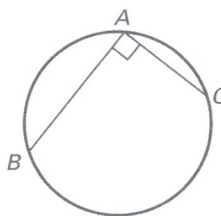
2. $m\widehat{BC} = ?$



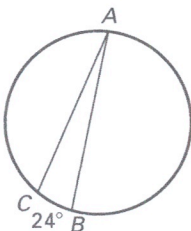
3. $m\angle BAC = ?$



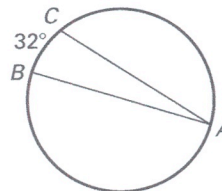
4. $m\widehat{BC} = ?$



5. $m\angle BAC = ?$



6. $m\angle BAC = ?$



Find the measure of the arc or angle in $\odot M$.

7. $m\angle QMP$

8. $m\angle NMO$

9. $m\angle PNO$

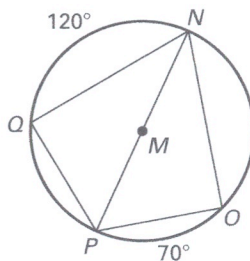
10. $m\angle QNP$

11. $m\widehat{QO}$

12. $m\widehat{NOP}$

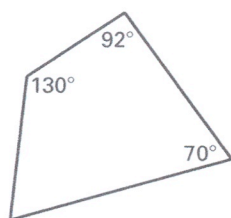
13. $m\widehat{PQ}$

14. $m\widehat{OQN}$

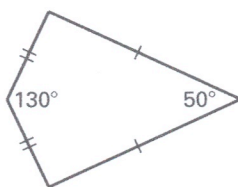


Decide whether a circle can be circumscribed about the quadrilateral.

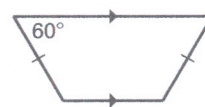
15.



16.

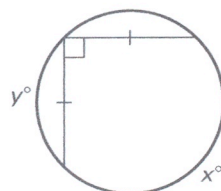


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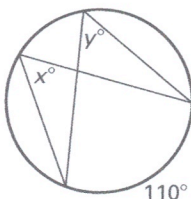


Find the value of each variable.

18.



19.



20.

